Amendments to the Claims

Claims 1-59 are cancelled.

60. (Currently Amended) Apparatus for construction of a soil reinforcement pier in a soil matrix comprising, in combination:

an elongate hollow tube having a longitudinal axis, a top material entrance end, an open bottom material discharge end and a first outer surface diameter; and

a unitary, shaped bottom head element at the open discharge end having a second outside surface diameter greater than the first surface outside diameter and configured to provide a combination of axial and transaxial stress components onto the soil matrix surrounding the bottom head element upon lowering the hollow tube into the soil matrix, said head element comprising a unitary attachment of the hollow tube; said head element including a leading bottom end having a generally frustoconical configuration and a trailing end having a generally frustoconical configuration;

a sacrificial head element cap closing the open end of said bottom;

said bottom head element with said cap and said hollow tube being shaped for insertion in a soil matrix to effect displacement of the soil as the hollow tube with the bottom head element and said cap are lowered into the soil matrix to form a cavity in the soil matrix, the said cap being disengageable and removable from the bottom head element as the hollow tube is subsequently raised from said formed cavity to allow material flow into the portion of the cavity vacated by the hollow tube and bottom head element.

61. (Currently Amended) Apparatus for construction of a soil reinforcement pier in a soil matrix comprising, in combination:

an elongate hollow tube having a longitudinal axis, a top material entrance end, an open bottom material discharge end and a first outer surface diameter;

a unitary, shaped bottom head element at the open discharge end having a second ~~outside~~ outer surface diameter greater than the first outer surface ~~outside~~ diameter and configured to provide a combination of axial and transaxial stress components onto the soil matrix surrounding the head element upon lowering the hollow tube into the soil matrix and upon downward force upon the hollow tube, said bottom head element comprising a unitary axial extension of the hollow tube with an axially aligned, open end and further including a mechanism for closing and opening the head element open end to block material flow from the head element open end upon closing and movement of the hollow tube downwardly in the soil matrix and to allow material flow from the head element open end upon opening with movement of the hollow tube upwardly in the soil matrix, said head element including a leading bottom end having a generally frustoconical configuration and a trailing end having a generally frustoconical configuration.

62. (Previously Presented) The apparatus of claim 60 or 61 further including a fluid feed mechanism for directing a fluid material into the hollow tube and a solid material feed mechanism for feeding aggregate material into the hollow tube entrance end.

63. (Currently Amended) The apparatus of claim 60 or 61 including aggregate in said hollow tube; ~~wherein the~~

said hollow tube ~~has~~ having a generally circular internal cross section and further including an aggregate feed mechanism connected to the top material entrance end for feeding items of aggregate material into said hollow tube wherein the minimum size of the internal diameter of the hollow tube is at least about 4.0 times the maximum size dimension of the largest item of aggregate material in said hollow tube.

64. (Previously Presented) The apparatus of claim 60 or 61 further including at least one auxiliary feed tube connected to the hollow tube through openings in the hollow tube end for feeding fluid material into the hollow tube.

65. (Previously Presented) The apparatus of claim 60 or 61 further including a hopper for feeding material into the hollow tube and at least one auxiliary feed tube connected to said hopper for feeding liquid material into the hollow tube

66. (Previously Presented) The apparatus of claim 60 or 61 or further including passageway openings in the hollow tube above the bottom heat element for fluid materials within the hollow tube to flow out of the hollow tube above the bottom head element and outside of the hollow tube into an annulus formed between the hollow tube and the soil matrix.

67. (Previously Presented) The apparatus of claim 60 or 61 further including a hopper feed mechanism connected to the top material entrance end of the hollow tube.

68. (Previously Presented) The apparatus of claim 60 or 61 further including a hopper and least one isolation damper connecting the hopper to the hollow tube.

69. (Previously Presented) The apparatus of claim 60 or 61 further including a force mechanism connected to the hollow tube for providing a downwardly directing force on said hollow tube.

70. (Previously Presented) The apparatus of claim 60 or 61 further including a force mechanism connected to the hollow tube for providing a downwardly directed static axial force.

71. (Previously Presented) The apparatus of claim 60 or 61 including a force mechanism for providing a force on the hollow tube selected from the group consisting of a vertically reciprocating force, a vertically vibrating dynamic axial force, and combinations thereof.

72. (Previously Presented) The apparatus of claim 60 wherein the sacrificial cap comprises a combination of transaxial plate member for retention within the formed

cavity and a rod member attached to the plate member and extending from the plate member generally axially into the head element and hollow tube.

member comprises a test element.

74. (Previously Presented) The apparatus of claim 72 wherein the plate member comprises an uplift anchor pier element.

75. (Previously Presented) The apparatus of claim 60 or 61 wherein the head element and hollow tube have a uniform cylindrical cross sectional profile.

76. (Currently Amended) Apparatus for construction of a soil reinforcement pier in a soil matrix comprising, in combination:

a generally cylindrical elongate hollow tube having a longitudinal axis, a top material entrance end, a bottom head element, an open bottom head element discharge end, the external cross section of the unitary bottom head element being greater than the external cross section of the hollow tube adjacent thereto to thereby form an axial bulbous end of the hollow tube having an external cross sectional shape and size greater than the external cross sectional shape and size of the hollow tube adjacent the bulbous end; said bulbous ~~section~~ end having a surface configured to impart axial and transaxial forces upon downward movement on material, said bulbous end including a leading bottom end having a generally frustoconical configuration and a trailing end having a generally frustoconical configuration;

said discharge end having a cross section shape and size substantially equal to the cross section shape and size of the internal cross section of the hollow tube adjacent the bulbous end; and

a closure mechanism in at discharge end for closing the discharge end of the bulbous end of the hollow tube upon downward movement of the hollow tube into a soil matrix and for opening the discharge end upon upward movement of the hollow tube in soil matrix.

77. (New) The apparatus of claim 60 wherein the outside surface of the frustoconical configurations each form an angle with said axis in the range of 45° to 15°.

78. (New) The apparatus of claim 61 wherein the outside surface of the frustoconical configurations each form an angle with said axis in the range of 45° to 15°.

79. (New) The apparatus of claim 76 wherein the outside surface of the frustoconical configurations each form an angle with said axis in the range of 45° to 15°.

80. (New) The apparatus of claim 60 wherein the axial length of the head element is in the range of about one to three times the outside surface diameter of the head element.

81. (New) The apparatus of claim 61 wherein the axial length of the head element is in the range of about one to three times the outside surface diameter of the head element.

82. (New) The apparatus of claim 76 wherein the axial length of the bulbous end is in the range of about one to three times the outside surface diameter of the bulbous end.

83. (New) The apparatus of claim 60 wherein the outside surface of the frustoconical configurations each form an angle with the longitudinal axis in the range of about 45°± 15° and the axial length of the head element is in the range of about one to three times the maximum outside diameter of the head element.

84. (New) The apparatus of claim 61 wherein the outside surface of the frustoconical configurations each form an angle with the longitudinal axis in the range of about 45° ± 15° and the axial length of the head element is in the range of about one to three times the maximum outside diameter of the head element.

85. (New) The apparatus of claim 76 wherein the outside surface of the frustoconical configurations each form an angle with the longitudinal axis in the range of about 45° ± 15° and the axial length of the bulbous end is in the range of about one to three times the

maximum outside diameter of the bulbous end.